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L14 ANSWER 20 OF 69 CAPLUS COPYRIGHT 2005 ACS on STN
 AN 1998:600193 CAPLUS
 DN 129:236922
 ED Entered STN: 22 Sep 1998
 TI Nickel (alloy) electroplating bath containing quaternary ammonium compound and electroplating of nickel (alloy) using it
 IN Kunishi, Tatsuo; Hirose, Naoto; Tokuda, Tamotsu; Endo, Masanori
 PA Murata Mfg. Co., Ltd., Japan
 SO Jpn. Kokai Tokkyo Koho, 6 pp.
 CODEN: JKXXAF

DT Patent
 LA Japanese
 IC ICM C25D003-12
 ICS C25D003-56
 CC 72-8 (Electrochemistry)
 Section cross-reference(s): 56

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 10245693	A2	19980914	JP 1997-48035	19970303
PRAI	JP 1997-48035			19970303	

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
JP 10245693	ICM	C25D003-12
	ICS	C25D003-56

OS MARPAT 129:236922

AB The bath with pH 3-10 comprises (A) a **Ni salt** and optional water-soluble **salt** of **B, Co, Cu, Fe, Mn, P, Sn, and/or Zn** and (B) a quaternary ammonium **salt brightener** selected from pyridinium salts, pyridazinium salts, pyrimidinium salts, pyrazinium salts, triazinium salts, quinolinium salts, isoquinolinium salts, cinnolinium salts, quinazolinium salts, quinoxalinium salts, phthalazinium salts, naphthyridinium salts, acridinium salts, phenanthridinium salts, phenazinium salts, phenanthrolinium salts, pyridoquinolinium salts, and pyrrolium salts. **Electroplating** of electronic parts using the above bath is also claimed. The bath gives **electroplating** products without corrosion of substrates and metal precipitation inside insulators.

ST nickel alloy electroplating bath; quaternary ammonium salt brightener electroplating nickel

IT Brightening
 (agents, quaternary ammonium compound; **electroplating** of nickel (alloy) using bath containing quaternary ammonium compound **brightener**)

IT Electrodeposition
 (**electroplating** of nickel (alloy) using bath containing quaternary ammonium compound **brightener**)

IT Quaternary ammonium compounds, uses
 RL: NUU (Other use, unclassified); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
 (**electroplating** of nickel (alloy) using bath containing quaternary ammonium compound **brightener**)

IT 93-23-2, Laurylisoquinolinium bromide 140-72-7, Cetylpyridinium bromide 2589-31-3, Benzylpyridinium bromide 42978-60-9 83690-77-1 212787-04-7 212787-05-8 212787-06-9 212787-07-0, 4-Hydroxy-1-laurylpyridinium chloride 212787-08-1
 RL: NUU (Other use, unclassified); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
 (**brightener**; **electroplating** of nickel)

(alloy) using bath containing quaternary ammonium compound **brightener**
)
IT 74-94-2, Dimethylamineborane 373-02-4, Nickel acetate 4180-12-5,
Copper acetate 7447-41-8, Lithium **chloride**, uses 7718-54-9,
Nickel chloride, uses 7720-78-7, Iron
sulfate (FeSO₄) 7733-02-0, Zinc **sulfate** 7772-99-8,
Tin chloride (SnCl₂), uses 7785-87-7, Manganese **sulfate**
7786-81-4, **Nickel sulfate** 10043-35-3, Boric acid
(H₃BO₃), uses 10124-43-3, **Cobalt sulfate**
13770-89-3, Nickel sulfamate 15843-02-4
RL: NUU (Other use, unclassified); PEP (Physical, engineering or chemical
process); PROC (Process); USES (Uses)
(electroplating of nickel (alloy) using bath containing
quaternary ammonium compound **brightener**)

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L2: Entry 1 of 2

File: JPAB

Sep 14, 1998

PUB-NO: JP410245693A

DOCUMENT-IDENTIFIER: JP 10245693 A

TITLE: ELECTROPLATING BATH FOR NICKEL AND NICKEL ALLOY AND ELECTROPLATING METHOD

PUBN-DATE: September 14, 1998

INVENTOR-INFORMATION:

NAME	COUNTRY
KUNISHI, TATSUO	
HIROSE, NAOTO	
TOKUDA, TAMOTSU	
ENDO, MASANORI	

ASSIGNEE-INFORMATION:

NAME	COUNTRY
MURATA MFG CO LTD	

APPL-NO: JP09048035

APPL-DATE: March 3, 1997

INT-CL (IPC): C25 D 3/12; C25 D 3/56

ABSTRACT:

PROBLEM TO BE SOLVED: To prevent corrosion of electronic parts and to prevent precipitation of metals on an insulating part even when the current density is increased, by incorporating a heterocyclic quaternary ammonium compd. as a brightener into a nickel or nickel alloy electroplating bath.

SOLUTION: The nickel or nickel alloy electroplating bath consists of a nickel salt or a nickel salt and a water-soluble salt of one or more elements selected from boron, cobalt, copper, iron, manganese, phosphorus, tin and zinc, and a brightener comprising a quaternary ammonium compd. expressed by formulae I to V. In formulae I to V, R1 is 6 to 18C alkyl group, R2, R3 are -H, -CH₃, -C₂H₅, -OH, -OCH₃, -OC₂H₅, -HN₂, -NO₂ -COOH, -SO₃H, X is at least one of halogen ions, CH₃SO₄⁻, C₂H₅SO₄⁻, CH₃COO⁻ and NO₃⁻. The pH of the plating bath is controlled to 3 to 10. The brightner is preferably added by about 0.01 to 1g/l.

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L2: Entry 2 of 2

File: DWPI

Sep 14, 1998

DERWENT-ACC-NO: 1998-551436

DERWENT-WEEK: 199906

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TITLE: Electroplating bath and electroplating for nickel or nickel alloy

PATENT-ASSIGNEE:

ASSIGNEE	CODE
MURATA MFG CO LTD	MURA

PRIORITY-DATA: 1997JP-0048035 (March 3, 1997)

PATENT-FAMILY:

PUB-NO	PUB-DATE	LANGUAGE	PAGES	MAIN-IPC
<input checked="" type="checkbox"/> JP 10245693 A	September 14, 1998		006	C25D003/12

APPLICATION-DATA:

PUB-NO	APPL-DATE	APPL-NO	DESCRIPTOR
JP 10245693A	March 3, 1997	1997JP-0048035	

INT-CL (IPC): C25 D 3/12; C25 D 3/56

ABSTRACTED-PUB-NO: JP 10245693A

BASIC-ABSTRACT:

An electroplating bath comprises: (a) a water-soluble salt consisting of a nickel salt, or the nickel salt and at least one element selected from boron, cobalt, copper, iron, manganese, phosphorus, tin, and zinc; (b) a quat. ammonium cpd. of any one of formulas (A)-(S) serving as a brightener.

Formula (1-(A))-P

Formula (2-(B))-P

Formula (3-(C))-P

Formula (4-(D))-P

Formula (5-(E))-P

Formula (6-(F))-P

Formula (7-(G))-P

Formula (8-(H))-P

Formula (9-(I))-P

Formula (10-(J))-P

Formula (11-(K))-P

Formula (12-(L))-P

Formula (13-(M))-P

Formula (14-(N))-P

Formula (15-(O))-P

Formula (16-(P))-P

Formula (17-(Q))-P

Formula (18-(R))-P

Formula (19-(S))-P

R1 = a 6-18C alkyl gp.; R2, R3 = -H, -CH₃, -C₂H₅, -OH, -OCH₃, -OC₂H₅, -NH₂, -NO₂, -COOH, -SO₃H; X = a halogen ion, CH₃SO₄-, C₂H₅SO₄-, CH₃COO-, or NO₃-; and (c) pH = 3-10.

Also claimed is that electroplating is applied to electronic parts, using the electroplating bath.

ADVANTAGE - No electronic parts are corroded and high current density is observed. No metal deposition to an insulator portion is evolved.

CHOSEN-DRAWING: Dwg.0/0

TITLE-TERMS: ELECTROPLATING BATH ELECTROPLATING NICKEL NICKEL ALLOY

DERWENT-CLASS: E13 L03 M11

CPI-CODES: E05-C; E05-F; E05-G; E05-L02; E05-L03; E06-D; E07-D; E31-K; E31-Q; E35; E35-W; L03-H; M11-A02; M11-B01;

CHEMICAL-CODES:

Chemical Indexing M3 *01*

Fragmentation Code

F011 F012 F013 F014 F431 F432 H100 H121 H321 H521
J011 J111 K0 K431 L7 L721 L941 L943 M210 M211
M212 M213 M214 M215 M216 M220 M221 M222 M223 M224
M225 M226 M231 M232 M233 M240 M272 M273 M281 M320
M413 M510 M521 M530 M540 M781 M903 M904 Q454 Q463
R023

Markush Compounds

199847-DJJ01-K 199847-DJJ01-U

Chemical Indexing M3 *02*

1

【特許請求の範囲】

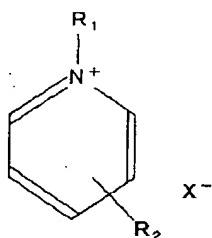
【請求項1】 以下の構成を具備するニッケル又はニッケル合金電気メッキ浴。

(1) ニッケル塩、又は、ニッケル塩と、ホウ素、コバルト、銅、鉄、マンガン、リン、錫、亜鉛の中から選ばれる1種以上の元素の水溶性塩

(2) 光沢剤として下記一般式[A]～[S]のいずれかで示される第4級アンモニウム化合物

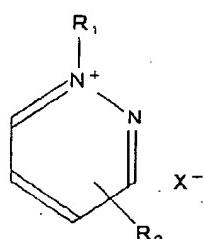
一般式[A]

【化1】



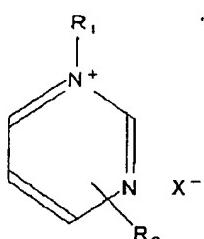
一般式[B]

【化2】



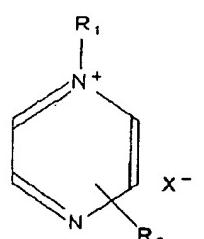
一般式[C]

【化3】



一般式[D]

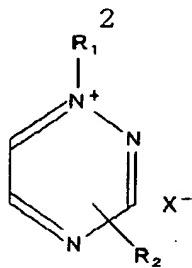
【化4】



一般式[E]

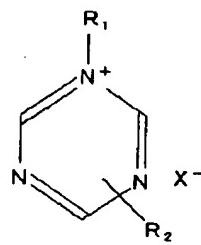
【化5】

10



一般式[F]

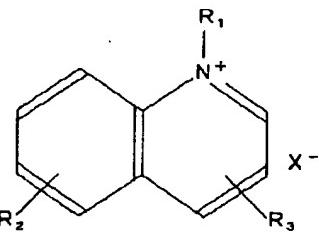
【化6】



一般式[G]

【化7】

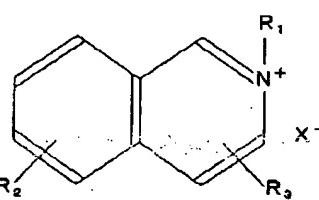
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一般式[H]

【化8】

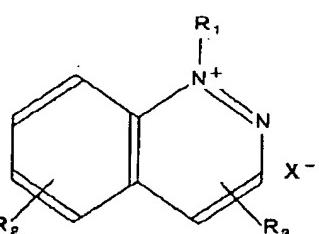
30



一般式[I]

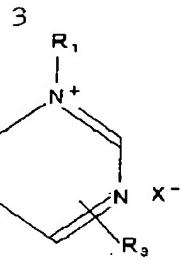
【化9】

40



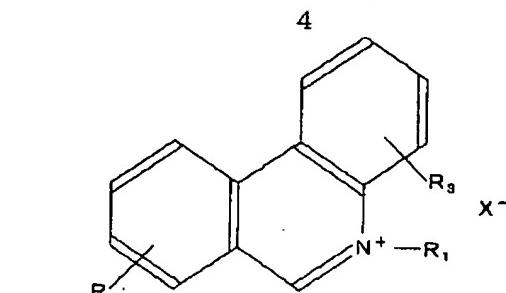
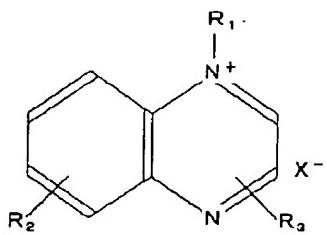
一般式[J]

【化10】



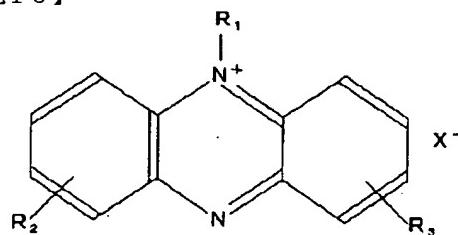
一般式 [K]

【化11】



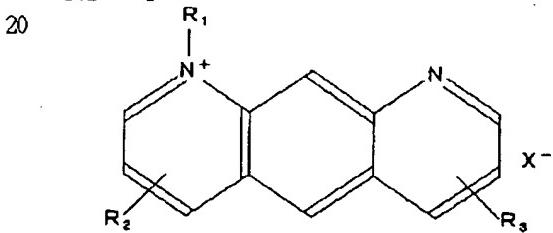
一般式 [P]

【化16】



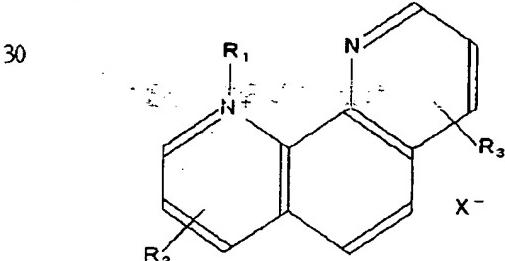
一般式 [Q]

【化17】



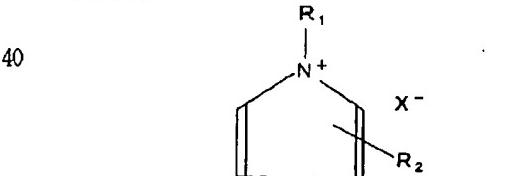
一般式 [R]

【化18】



一般式 [S]

【化19】



(ただし、R₁は炭素数6~18のアルキル基、R₂、R₃は-H、-CH₃、-C₂H₅、-OH、-OCH₃、-OC₂H₅、-NH₂、-NO₂、-COOH、-SO₃H、Xはハロゲンイオン、CH₃SO₄⁻、C₂H₅SO₄⁻、CH₃COO⁻、NO₃⁻のうち少なくとも1種類)

50 (3) pH 3~pH 10

【請求項2】 請求項1に記載のニッケル又はニッケル合金電気メッキ浴を用いて電子部品を電気メッキすることを特徴とするニッケル又はニッケル合金の電気メッキ方法。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は電子部品のメッキ工程に用いられるニッケル又はニッケル合金電気メッキ浴、およびその電気メッキ方法に関するものである。

【0002】

【従来の技術】通常、セラミック、ガラス、プラスチック等を素材とした電子部品には、その電極の半田濡れ性の向上等を目的として、錫もしくは錫合金メッキが施されるが、そのうちの多くは、半田喰われやホイスカーフ防止の目的で、下地にニッケルもしくはニッケル合金メッキが施される。

【0003】この際、金属をメッキする場合では起こらないような様々な問題が発生する。

【0004】例えば、ガラスやセラミック材を用いたチップ部品の中には、pH 2.0 前後の塩化物浴を用いてメッキした場合には、ガラスやセラミックが著しい浸食を受けたり、pH 4.0 前後のワット浴やスルファミン酸浴を用いてメッキした場合には、ガラスやセラミックの浸食は見られないものの、本来絶縁体であるガラスやセラミックにもメッキが付くと言った現象が生じるものがある。

【0005】かかる問題に対処するため、この種の部品を鍍金する場合、これまでには、pH 4～pH 6 のニッケルもしくはニッケル合金浴を用い、メッキ電流を極端に小さくすると言った対策を講じてきた。

【0006】

【発明が解決しようとする課題】しかしながら、メッキ電流を極端に小さくすることは、下記(ア)～(ウ)などの様々な問題につながる。

(ア) メッキ時間の長時間化による生産性の低下

(イ) 長時間浸漬による部品の特性劣化

(ウ) 電極の一部で発生するメッキ不着

本発明は上記のような問題点に鑑みてなされたもので、電子部品が浸食されることなく、且つ、電流密度を高くしても、絶縁体部への金属析出が起こらないようなニッケル又はニッケル合金電気メッキ浴およびその電気メッキ方法を提供することを目的とする。

【0007】

【課題を解決するための手段】本発明は、上記の課題を解決するためにニッケル又はニッケル合金電気メッキ浴およびその電気メッキ方法を完成するに至った。本願第1の発明のニッケル又はニッケル合金電気メッキ浴は、(1) ニッケル塩、又は、ニッケル塩と、ホウ素、コバルト、銅、鉄、マンガン、リン、錫、亜鉛の中から選ばれる1種以上の元素の水溶性塩と、(2) 光沢剤として

上記一般式 [A] ～ [S] のいずれかで示される第4級アンモニウム化合物（ただし、R₁は炭素数6～18のアルキル基、R₂、R₃は-H、-CH₃、-C₂H₅、-OH、-OCH₃、-OC₂H₅、-NH₂、-NO₂、-COOH、-SO₃H、Xはハロゲンイオン、CH₃SO⁻、C₂H₅SO₄⁻、CH₃COO⁻、NO₃⁻のうち少なくとも1種類）と、(3) pH 3～pH 10とを具備することに特徴がある。

【0008】また、本願第2の発明のニッケル又はニッケル合金の電気メッキ方法は、上記のニッケル又はニッケル合金電気メッキ浴を用いて電子部品を電気メッキすることに特徴がある。

【0009】

【発明の実施の形態】本願第1の発明のニッケル又はニッケル合金電気メッキ浴が上記のような構成により、本発明の目的を達成できる理由は次の通りである。すなわち、以下の現象(1)～(2)を突き止め、光沢剤について更に検討を加えた結果、(a)～(b)を満たす上記の一般式の光沢剤で示されるような第4級アンモニウム化合物を、pH 3～pH 10 のニッケル又はニッケル合金電器メッキ浴に添加することで、上記絶縁体上への金属析出が著しく抑制されることを見出した。

【0010】(1) 電子部品の構成材料であるセラミックやガラスの溶出は、pH に大きく依存し、特に pH 2 以下または pH 10 以上の領域で顕著となる。

(2) 絶縁体部への金属析出は絶縁体部の浸食が大きいほど起こりやすく、また光沢剤の種類によっても著しく析出状態は異なる。

【0011】(a) 窒素原子を含む員環もしくは6員環複素環状構造であること。

(b) 窒素原子に結合するアルキル基は、炭素数6～18のバルキーな基であること。

【0012】本願第1の発明で示される光沢剤が界面活性剤として上記課題に対し有効に作用する詳細な機構は明らかでないが、下記(1)～(2)のような構造であることが上記金属析出の抑制に作用しているものと思われる。

(1) R₁で示されるアルキル基がある程度の大きさを持つ(直鎖状の場合は炭素数8以上、環状の場合は炭素数6以上)。

(2) 窒素原子が被鍍金物に対して接近でき、且つ、界面活性剤同士が密に詰まって吸着できるように、R₂、R₃で示される側鎖基は分子量の小さい官能基からなる。

【0013】R₁で示されるアルキル基は、炭素数6～18、好適には12～16であって、直鎖でも分岐を持っていてもまたは環状であっても良い。炭素数が6より小さい場合には抑制効果を失い、18より大きい場合には水溶性を失う。

【0014】R₂、R₃で示される側鎖基は、分子量の小

さい官能基であれば、抑制効果を損なうことはない。ただ分子量が大きくなると抑制効果は次第に低下する。

【0015】次に、上記光沢剤の添加量であるが、多量に加えると還元分解が盛んになり工程上の管理が煩雑となるため、少なめとすることが望ましく、0.01~1g/l、より好ましくは0.01~0.5g/lである。

【0016】上記光沢剤を添加すべき基本浴について
は、以下(1)～(2)のような理由から、pH3～pH10の領域内にあれば、特に限定されない。

(1) ガラスやセラミックの浸食は、浴組成よりも浴の*

* pHに影響される。

(2) ガラスやセラミック上への金属析出は、本発明によって示される光沢剤によって抑制される。

【0017】次に、本発明を実施例に基づき、さらに具体的に説明するが、本発明はかかる実施例のみに限定されるものではない。

[0018]

【実施例】表1に試料No. 1～試料No. 14の組成とpHと浴温(℃)を示す。

[0019]

【表1】

試料 No							pH	溶温 (°C)
1	硫酸ニッケル 330(g/l)	塩化ニッケル 45(g/l)	ホウ酸 38(g/l)	臭化セチルピリジニウム 0.5(g/l)				4.2 60
2	スルファミン酸ニッケル 300(g/l)	塩化ニッケル 6(g/l)	ホウ酸 30(g/l)	臭化ベンジルピリジニウム 0.5(g/l)				4.2 60
3	塩化ニッケル 300(g/l)	塩化アノニウム 25(g/l)	ホウ酸 30(g/l)	塩化セチルピリジニウム 0.5(g/l)				5.6 45
4	硫酸ニッケル 50(g/l)	塩化リチウム 300(g/l)	ンバク酸 40(g/l)	アンモニア水 70(m/l)	ジメチルアミボラン 1(g/l)	塩化-4-ヒドロキシ-1-テトラクリルピリジニウム 0.5(g/l)		6.0 55
5	硫酸ニッケル 240(g/l)	塩化ニッケル 30(g/l)	硫酸ニッケル 15(g/l)	硫酸コリト 2.0(g/l)	硫酸アノニウム 1.5(g/l)	ホウ酸 30(g/l)	塩化セチルキノリニウム 0.5(g/l)	4.7 40
6	酢酸ニッケル 124(g/l)	酢酸銅 50(g/l)	更化ラウリルイソキノニウム 0.5(g/l)					5.5 30
7	硫酸ニッケル 85(g/l)	塩化ニッケル 135(g/l)	ホウ酸 50(g/l)	硫酸第1鉄 50(g/l)	塩化-1-オクチルピリジン 0.5(g/l)			3.5 55
8	スルファミン酸ニッケル 600(g/l)	硫酸マンガン 10(g/l)	ホウ酸 40(g/l)	塩化-1-セチル-1,3,5-トリアジン 0.5(g/l)				4.0 60
9	硫酸ニッケル 240(g/l)	塩化ニッケル 45(g/l)	ホウ酸 30(g/l)	亜リ酸 5(g/l)	塩化-2-ラウリルジンノブタン 0.5(g/l)			4.0 60
10	硫酸ニッケル 120(g/l)	塩化第1錫 3(g/l)	クエン酸 60(g/l)	グリシン 20(g/l)	ホウ酸 20(g/l)	臭化ラウリアルギジン 0.5(g/l)		6.0 40
11	硫酸ニッケル 263(g/l)	硫酸亜鉛 144(g/l)	ホウ酸 20(g/l)	臭化-1-ラウリルフェナジン 0.5(g/l)				4.0 40
* 12	塩化ニッケル 300(g/l)	ホウ酸 38(g/l)						2.0 60
* 13	硫酸ニッケル 330(g/l)	塩化ニッケル 45(g/l)	ホウ酸 38(g/l)					4.2 60
* 14	スルファミン酸ニッケル 300(g/l)	塩化ニッケル 6(g/l)	ホウ酸 30(g/l)					4.2 60

【0020】また、表1の試料からなるメッキ浴を使用し、鉛ガラスを焼き付けた(3φ)5×5mmニッケル単板に電流密度(A/dm²)とメッキ時間(min)を変えてメッキ処理した。そのときの鉛ガラスの浸食状態と鉛ガラス上へのメッキの付き方を表2に示す。

※著しい金属析出が認められる状態を表している

[0022]

[表2]

【0021】なお、表2のガラス部の浸食の中で、○と示したものは外観上浸食された形跡が全く認められない状態を表し、△と示したものは外観上わずかに浸食された形跡が認められる状態を表し、×と示したものは外観上浸食された形跡が著しく認められる状態を表している。また、表2のガラス部のメッキの中で、○と示したものはガラス上に金属析出がほとんど認められない状態を表し、△と示したものはガラス上に金属析出がわずかに認められる状態を表し、×と示したものはガラス上に※50

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試料 No	電流密度 (A/dm ²)	メッキ時間 (min)	ガラス部の 浸食	ガラス部の めっき
1	0.1	120	○	○
	1.0	12	○	○
	2.0	6	○	○
2	0.1	120	○	○
	1.0	12	○	○
	2.0	6	○	○
3	0.1	120	○	○
	1.0	12	○	○
	2.0	6	○	○
4	0.1	120	○	○
	1.0	12	○	○
	2.0	6	○	○
5	0.1	120	○	○
	1.0	12	○	○
	2.0	6	○	○
6	0.1	120	○	○
	1.0	12	○	○
	2.0	6	○	○
7	0.1	120	○	○
	1.0	12	○	○
	2.0	6	○	○
8	0.1	120	○	○
	1.0	12	○	○
	2.0	6	○	○
9	0.1	120	○	○
	1.0	12	○	○
	2.0	6	○	○
10	0.1	120	○	○
	1.0	12	○	○
	2.0	6	○	○
11	0.1	120	○	○
	1.0	12	○	○
	2.0	6	○	○
*12	0.1	120	×	×
	1.0	12	△	×
	2.0	6	○	×
*13	0.1	120	○	○
	1.0	12	○	△
	2.0	6	○	×
*14	0.1	120	○	○
	1.0	12	○	△
	2.0	6	○	×

(*は本発明の範囲外)

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【0023】表2からも明らかなように、試料12で示されるpH2の酸性浴(塩化物浴)では、浸食時間が長い場合にはガラス部の浸食もガラス部への金属析出も認められる。これに対し、試料13(ワット浴)、試料14(スルファミン酸浴)で示されるような弱酸性の浴では、ガラス部の浸食は抑えられるものの、電流密度が高くなつた場合にはガラス部への金属析出が認められる。

【0024】一方、試料1～試料11で示される浴の場合、電流密度を高くしてもガラス部の浸食もガラス部への金属析出も認められない。

【0025】

【発明の効果】本発明を用いれば、電子部品が浸食されることなく、且つ、電流密度を高くしても、絶縁体部への金属析出が起こらないようにすることが可能である。

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フロントページの続き

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DETAILED DESCRIPTION

[Detailed Description of the Invention]**[0001]**

[Field of the Invention] This invention relates to the nickel used for the plating process of electronic parts or a nickel alloy electroplating bath, and its electroplating approach.

[0002]

[Description of the Prior Art] Usually, although tin or tin alloy plating is performed to electronic parts made from a ceramic, glass, plastics, etc. for the purpose of the improvement in solder wettability of the electrode etc., many of them are the purposes of solder ***** or whisker prevention, and nickel or nickel alloy plating is performed to a substrate.

[0003] Under the present circumstances, various problems which do not arise occur in the case where a metal is plated.

[0004] For example, although the corrosion of glass or a ceramic is not seen when corrosion with glass and a ceramic remarkable when it plates using the chloride bath before and behind pH2.0 is received or it plates in the chip using glass or ceramic material using the Watts bath and sulfamic acid bath before and behind pH4.0, there are some which the phenomenon referred to as that plating is attached also to glass and the ceramic which are originally an insulator produces.

[0005] In order to cope with this problem, when plating this kind of components, the cure referred to as making a plating current extremely small has been taken until now using the nickel or the nickel alloy bath of pH4-pH6.

[0006]

[Problem(s) to be Solved by the Invention] However, making a plating current extremely small leads to various problems, such as the following (a) - (c).

(a) Even if plating miscarriage this invention generated with some property degradation (c) electrodes of the components by fall (b) long duration immersion of the productivity by long-duration-izing of plating time amount makes current density high, without having been made in view of the above troubles and electronic parts corroding, aim at offering nickel with which the metal deposit to the insulator section does not take place or a nickel alloy electroplating bath, and its electroplating approach.

[0007]

[Means for Solving the Problem] This invention came to complete nickel or a nickel alloy electroplating bath, and its electroplating approach, in order to solve the above-mentioned technical problem. The nickel or the nickel alloy electroplating bath of invention of this application 1st (1) nickel salt, Or nickel salt, boron and cobalt, copper, iron, manganese, Lynn, tin, and the water-soluble salt of one or more sorts of elements chosen from zinc, (2) The 4th class ammonium compound shown by either of above-mentioned general formula [A] - [S] as a brightener R1 [however,] -- the alkyl group of carbon numbers 6-18, and R2 and R3 -H -- CH₃, -C₂H₅, -OH, -OCH₃, -OC₂H₅, -NH₂, -NO₂, -COOH, - SO₃H and X have the description in providing at least one kind and (3) pH3-pH10 among halogen ion, compound CH₃SO₄-, C₂H₅SO₄-, CH₃COO-, and NO₃-.

[0008] Moreover, the nickel of invention of this application 2nd or the electroplating approach of a

pH 3-10

nickel alloy has the description in carrying out electroplating of the electronic parts using above-mentioned nickel or an above-mentioned nickel alloy electroplating bath.

[0009]

[Embodiment of the Invention] The reason the nickel or the nickel alloy electroplating bath of invention of this application 1st can attain the purpose of this invention by the above configurations is as follows. That is, as a result of tracing following phenomenon (1) - (2) and adding examination further about a brightener, it found out that the metal deposit of a up to [the above-mentioned insulator] was controlled remarkably by adding the 4th class ammonium compound as shown by the brightener of the above-mentioned general formula which fills (a) - (b) to the nickel of pH3-pH10, or a nickel alloy electrical machinery plating bath.

[0010] (1) The elution of the ceramic which is the component of electronic parts, or glass is greatly dependent on pH, and becomes remarkable especially in a with two or less pH or a pH of ten or more field.

(2) The metal deposit to the insulator section tends to take place, so that the corrosion of the insulator section is large, and a deposit condition changes remarkably also with classes of brightener.

[0011] (a) It is five membered-rings or 6 membered-ring heterocycle-like structure containing a nitrogen atom.

(b) The alkyl group combined with a nitrogen atom should be a bulky radical of carbon numbers 6-18.

[0012] Although the detailed device in which the brightener shown by this application 1st invention acts effectively to the above-mentioned technical problem as a surfactant is not clear, it is thought that that it is structure like following the (1) - (2) is acting on control of the above-mentioned metal deposit.

(1) The alkyl group shown by R1 has a certain amount of magnitude (in the case of-like [straight chain], it is eight or more carbon numbers, and when annular, they are six or more carbon numbers).

(2) The side chain radical shown by R2 and R3 consists of a functional group with small molecular weight so that a nitrogen atom can approach to a plated object, and surfactants may be densely got blocked and they can adsorb.

[0013] the alkyl group shown by R1 -- carbon numbers 6-18 -- it may be 12-16 suitably, and it may have branching also with the straight chain, or may be annular. When a carbon number is smaller than 6, depressor effect is lost, and in being larger than 18, it loses water solubility.

[0014] If the side chain radical shown by R2 and R3 is a functional group with small molecular weight, it will not spoil depressor effect. If molecular weight merely becomes large, depressor effect will fall gradually.

[0015] Next, although it is the addition of the above-mentioned brightener, since reduction decomposition will prosper and the management on a process will become complicated if it adds so much, it is desirable to suppose that it is few and it is 0.01 - 0.5 g/l more preferably 0.01 to 1 g/l.

[0016] About the basic bath which should add the above-mentioned brightener, below, since [like (1) - (2)], if it is in the field of pH3-pH10, it will not be limited especially.

(1) The corrosion of glass or a ceramic is influenced by pH of a bath rather than a bath presentation.

(2) The metal deposit of a up to [glass or a ceramic] is controlled by the brightener shown by this invention.

[0017] Next, although this invention is explained still more concretely based on an example, this invention is not limited only to this example.

[0018]

[Example] A presentation, pH, and bath temperature (degree C) of sample No.1- sample No.14 are shown in Table 1.

[0019]

[Table 1]

試料 No							pH	浴温 (°C)	
1	硫酸ニッケル 330(g/l)	塩化ニッケル 45(g/l)	ホウ酸 38(g/l)	臭化セチルピリジニウム 0.5(g/l)			4.2	60	
2	スルファミン酸ニッケル 300(g/l)	塩化ニッケル 6(g/l)	ホウ酸 30(g/l)	臭化ベンジルピリジニウム 0.5(g/l)			4.2	60	
3	塩化ニッケル 300(g/l)	塩化アンモニウム 25(g/l)	ホウ酸 30(g/l)	塩化セチルピリジニウム 0.5(g/l)			6.6	45	
4	硫酸ニッケル 50(g/l)	塩化リチウム 300(g/l)	ユウ酸 40(g/l)	アンモニア水 70(ml/l)	ジメチルアミボラン 1(g/l)	塩化-4-ヒドロキシ-1-ラウリルピリジニウム 0.5(g/l)	6.0	55	
5	硫酸ニッケル 240(g/l)	塩化ニッケル 30(g/l)	硫酸ニッケル 15(g/l)	硫酸コリト 2.6(g/l)	硫酸アンモニウム 1.5(g/l)	ホウ酸 30(g/l)	塩化セチルキノリニウム 0.5(g/l)	4.7	40
6	硫酸ニッケル 124(g/l)	酢酸銅 50(g/l)	臭化ラウリルイソキナリニウム 0.5(g/l)					5.5	30
7	硫酸ニッケル 85(g/l)	塩化ニッケル 135(g/l)	ホウ酸 50(g/l)	硫酸第1鉄 50(g/l)	塩化-1-オクチルピリジン 0.5(g/l)			3.5	55
8	スルファミン酸ニッケル 600(g/l)	硫酸マンガン 10(g/l)	ホウ酸 40(g/l)	塩化-1-セチル-1,3,5-トリアジン 0.5(g/l)				4.0	60
9	硫酸ニッケル 240(g/l)	塩化ニッケル 45(g/l)	ホウ酸 30(g/l)	亜リン酸 5(g/l)	塩化-2-ラウリルシンバリン 0.5(g/l)			4.0	60
10	硫酸ニッケル 120(g/l)	塩化第1錫 3(g/l)	クエン酸 60(g/l)	グリシン 20(g/l)	ホウ酸 20(g/l)	臭化ラウリルアクリジン 0.5(g/l)		6.0	40
11	硫酸ニッケル 263(g/l)	硫酸亜鉛 144(g/l)	ホウ酸 20(g/l)	臭化-1-ラウリルフェニジン 0.5(g/l)				4.0	40
*12	塩化ニッケル 300(g/l)	ホウ酸 38(g/l)						2.0	60
*13	硫酸ニッケル 330(g/l)	塩化ニッケル 45(g/l)	ホウ酸 38(g/l)					4.2	60
*14	スルファミン酸ニッケル 300(g/l)	塩化ニッケル 6(g/l)	ホウ酸 30(g/l)					4.2	60

(* は本発明の範囲外)

[0020] Moreover, the plating bath which consists of a sample of Table 1 was used, current density (A/dm²) and plating time amount (min) were changed into 5 (3phi)x5mm nickel veneer which was able to be burned in lead glass, and plating processing was carried out. How to attach plating to up to the corrosion condition of the lead glass at that time and lead glass is shown in Table 2.

[0021] in addition, the thing which what was indicated to be O expressed the condition that the trace by which exterior corrosion was carried out was not accepted at all, and was indicated to be ** in the corrosion of the glass section of Table 2 -- an exterior -- expressing the condition that the trace corroded slightly is accepted, what was indicated to be x expresses the condition that the trace by which exterior corrosion was carried out is accepted remarkably. Moreover, what was indicated to be O in plating of the glass section of Table 2 expresses the condition that a metal deposit is hardly accepted on glass, what was indicated to be ** expresses the condition that a metal deposit is slightly accepted on glass, and what was indicated to be x expresses the condition that a remarkable metal deposit is accepted on glass.

[0022]

[Table 2]

試料 No	電流密度 (A/dm ²)	メッキ時間 (min)	ガラス部の 浸食	ガラス部の メッキ
1	0.1	120	○	○
	1.0	12	○	○
	2.0	6	○	○
2	0.1	120	○	○
	1.0	12	○	○
	2.0	6	○	○
3	0.1	120	○	○
	1.0	12	○	○
	2.0	6	○	○
4	0.1	120	○	○
	1.0	12	○	○
	2.0	6	○	○
5	0.1	120	○	○
	1.0	12	○	○
	2.0	6	○	○
6	0.1	120	○	○
	1.0	12	○	○
	2.0	6	○	○
7	0.1	120	○	○
	1.0	12	○	○
	2.0	6	○	○
8	0.1	120	○	○
	1.0	12	○	○
	2.0	6	○	○
9	0.1	120	○	○
	1.0	12	○	○
	2.0	6	○	○
10	0.1	120	○	○
	1.0	12	○	○
	2.0	6	○	○
11	0.1	120	○	○
	1.0	12	○	○
	2.0	6	○	○
*12	0.1	120	×	×
	1.0	12	△	×
	2.0	6	○	×
*13	0.1	120	○	○
	1.0	12	○	△
	2.0	6	○	×
*14	0.1	120	○	○
	1.0	12	○	△
	2.0	6	○	×

(*は本発明の範囲外)

[0023] When corrosion time amount is long, by the acid bath (chloride bath) of pH2 shown by the sample 12, the metal deposit to the glass section is also accepted also for the corrosion of the glass section, so that clearly also from Table 2. On the other hand, in a weak acidic bath as shown by the sample 13 (Watts bath) and the sample 14 (sulfamic acid bath), although the corrosion of the glass section is suppressed, when current density becomes high, the metal deposit to the glass section is accepted.

[0024] On the other hand, in the case of the bath shown by the sample 1 - the sample 11, even if it makes current density high, the metal deposit to the glass section is not accepted for the corrosion of the glass section, either.

[0025]

[Effect of the Invention] Even if it makes current density high, without electronic parts corroding if this invention is used, it is able to make it for the metal deposit to the insulator section not to take place.

[Translation done.]

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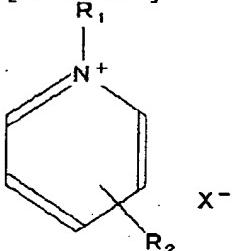
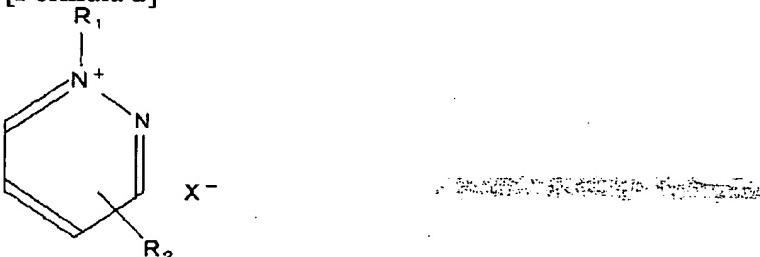
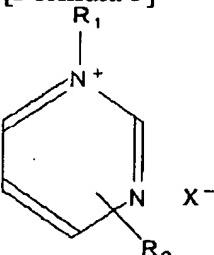
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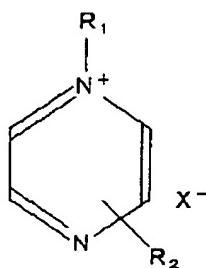
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CLAIMS

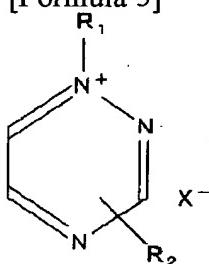
[Claim(s)]

[Claim 1] The nickel or the nickel alloy electroplating bath possessing the following configurations.
(1) Nickel salt or nickel salt, boron and cobalt, copper, iron, manganese, Lynn, tin, the 4th class ammonium compound general formula shown by either of following general formula [A] - [S] as a water-soluble salt (2) brightener of one or more sorts of elements chosen from zinc [A]

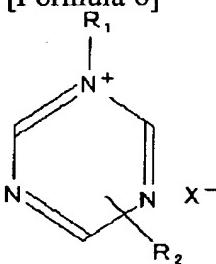
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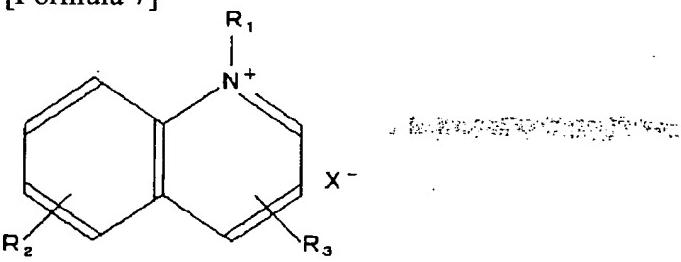
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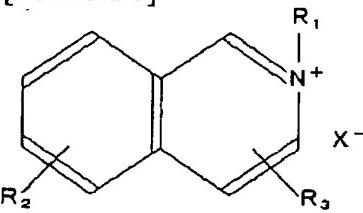
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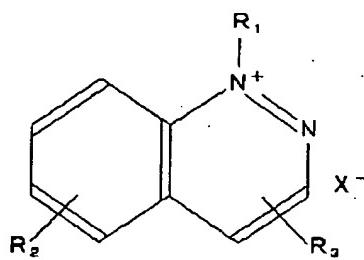
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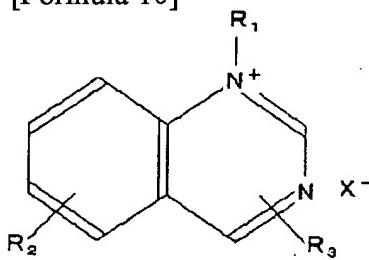
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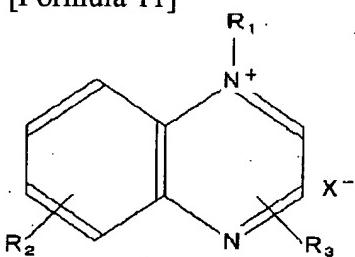
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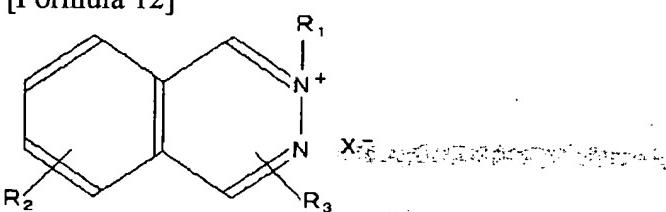
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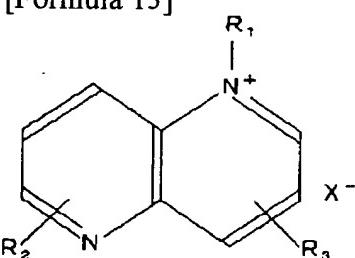
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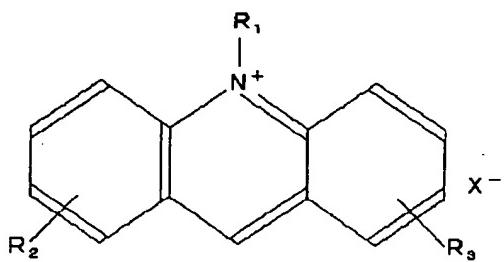
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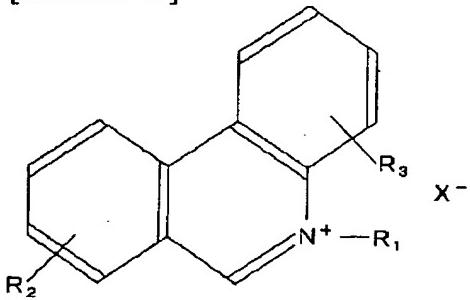
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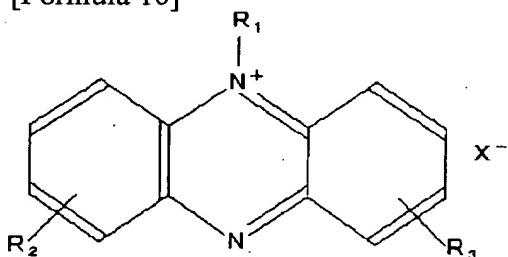
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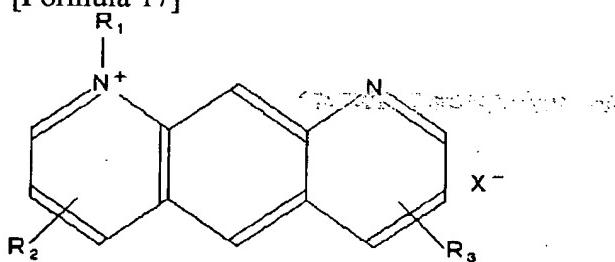
General formula [O]
[Formula 15]



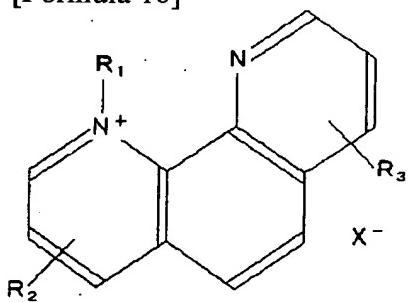
General formula [P]
[Formula 16]



General formula [Q]
[Formula 17]

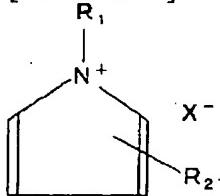


General formula [R]
[Formula 18]



General formula [S]

[Formula 19]



(It corrects and, for the alkyl group of carbon numbers 6-18, and R2 and R3, -H, -CH3, -C2H5, -OH, -OCH3, -OC2H5, -NH2, -NO2, -COOH, -SO3H, and X are [R1] at least one kind in halogen ion, CH3SO4-, C2H5SO4-, CH3COO-, and NO3-)

(3) pH3 - pH 10 [Claim 2] The electroplating approach of the nickel characterized by carrying out electroplating of the electronic parts using nickel according to claim 1 or a nickel alloy electroplating bath, or a nickel alloy.

[Translation done.]

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